FEDERAL REPUBLIC OF GERMANY
GERMAN PATENT OFFICE
CL. 72 g 2/05
INTERNAT. Cl. F 07 j

PRELIMINARY PATENT 1063936

G 23963X1/72 g

FILING DATE: 20 FEBRUARY 1958
FILING ANNOUNCED AND PRELIMINARY PATENT ISSUED:20 AUGUST 1959

Applicant:
Göcke & Sohn Aktiengesellschaft, Hohenlimburg (Westphalia)
Inventor:
Alfons Nagele, Hohenlimburg (Westphalia)

SHEET OF FABRIC FREE OF CAMOUFLAGE SPOTS AND PROCESS FOR ITS PRODUCTION

The invention concerns unicolor or essentially unicolor (therefore free of camouflage spots) color fabric sheets whose visual color corresponds to the average of the color shades occurring the territory; its purpose is to design such fabric sheets in such a way that they are match the surrounding countryside not only when viewed visually but also in the infrared. The invention further envisions a process for the production of such fabrics.

The well-known unicolor fabrics required especially for military purposes, i.e. for personnel clothing or for concealing equipment are colored by using a dye which has a color shade matching the surrounding territory, i.e. one which corresponds to the average of the color shades occurring in the area. Khaki, soil color, sand color and various shades of olive come into consideration as such color shades.

Besides the visual color shade, the behavior of the unicolor fabric in the infrared wavelength range, especially the range from 750 to 1400 mμ; plays an increasingly important role, i.e. the unicolor selected should match the countryside in said infrared range, therefore be adapted in its reflectivity to the average infrared behavior of the surrounding natural materials. This requirement would be easily satisfied if the artificial dyestuffs used for coloring the fabric corresponded in their infrared behavior to that of the surrounding natural materials. Unfortunately, this is not the case.

Thus, for example, one of the most important natural substances is leaf green. In the near infrared this already shows a steep rise in infrared reflectivity, the so-called chlorophyll rise. Only a few green and blue dyestuffs have this or a similar rise in the infrared range, but their infrared reflectivity, especially at the dye concentration to be applied, is much too high. The ratios of other natural substances are similar to those for blue green.

If one attempts to lower the high infrared reflectivity in the coloring by the admixture of highly absorbing dyestuffs, then the absorptions of the mixed-in dyestuffs

are added up, and the desired increase in infrared reflectivity is no longer present.

Therefore, in most cases it is impossible to obtain the necessary and required infrared reflectivity values by dyeing the fabric with mixed colors and thereby achieve the territorial average over a broad infrared wavelength range.

It has now been found that a visually unicolor or essentially unicolor fabric displays the desired infrared behavior when its visual color corresponding to the average of the color shades occurring in the territory is produced by additive color mixing of a uniform base coloring of the fabric and a preferably printed-on partially covering overlaid color, and the covering up of the basic color caused by this color overlay is selected in such a way that a too high infrared reflectivity value of the basic coloring compared to the surrounding territory is also depressed by the additive effect to the value corresponding to the average of the infrared reflectivity values of the surrounding territory.

Such a colored fabric is produced according to the invention preferably in such a way that the undyed sheet is first pre-dyed uniformly with a visual dye displaying approximately the desired color matching the territory, when viewed in the infrared, has a higher reflectivity value than the average of the surrounding territory, and on the thus-pre-treated fabric sheet a partially covering print is applied which depresses the somewhat too high infrared reflectivity value to the desired value, and on the other hand, when viewed visually, as a result of additive color mixing with the color of the basic coloring of the fabric yields the desired color shade matching the territory. In this case it is especially advantageous for the dyestuffs or dyestuff combinations used for the basic coloring of the fabric sheet and its partially covering color overlays not to mix with one another in the dyeing process.

For the basic coloring of the fabric sheet, dyestuffs are preferred which display the chlorophyll rise and yield approximately the same infrared reflectivity in the broadest possible wavelength range. In this case, the basic coloring is so selected that the additive cover mixing caused by the later color overlay corresponds to the desired visual coloring of the fabric sheet. For the color overlay, on the other hand, dyestuffs or dyestuff combinations are preferred which display strong absorption in the infrared in the broadest possible wavelength range. However, when the above-mentioned procedure was applied, even those basic colorings and overlays that did not fully satisfy the stated requirements resulted in a considerable improvement compared to simple dyeing.

The application of the color overlay to the basic color of the fabric sheet can be accomplished, e.g., with raster/anilox, picco or blotch rolls or with contour line rolls, but stippling or other small area patterns can also be applied with conventional devices. The color overlay may be applied on only one side of the fabric as well as on both sides, in which case the basic coloring of the fabric sheet may be different on the two sides. If one plans to coat on both sides, one has the possibility of producing a fabric with variably high infrared reflectivity values and optionally also different visual color shades. If one selects instead of a uniform color overlay a graduated one such as can be achieved, e.g., by blotching effects of different density or by rolls engraved only in certain areas, then one obtains graduations in the reflectivity values in the infrared range which have been proven very beneficial according to experience.

Example

An unstained fabric sheet is provided with a uniform olive base coloring by means a mixture of dyestuffs displaying the chlorophyll rise. The finally dyed fabric sheet is then blotched by means of a blotching roll with ferrocyan vapor black, steamed and finished by known methods. The visual deepening of the color shade caused by the overprint was allowed for in advance. One obtains a visually olive colored fabric sheet which displays an approximate chlorophyll rise in the infrared range and possesses an approximately constant infrared reflectivity value from 750 to 1400 mμ, whose level depends on the density of the blotching effect.

PATENT CLAIMS:

1. Colored fabric sheet free of camouflage spots, whose visual color corresponds to the average color shades occurring in the territory, characterized in that its visual color is formed by an additive color blend of a uniform basic coloring of the fabric and a partially covering color overlay preferably created by printing, the covering of the basic color caused by this color overlay being selected such that a too high infrared reflectivity value of the basic coloring compared to the surrounding territory is depressed by the additive effect to the value corresponding to the average of the infrared reflectivity values of the surrounding territory.
2. Process for production of colored fabric sheets as in claim 1, characterized in that the uncolored fabric sheet is first pre-dyed uniformly with a visual dye displaying approximately the desired color matching the territory, which when viewed in the infrared, has a higher reflectivity value than the average of the surrounding territory and on the thus-pre-treated fabric sheet a partially covering print is applied which depresses the somewhat too high infrared reflectivity value to the desired value, and on the other hand, when viewed visually, as a result of additive color mixing with the color of the basic coloring of the fabric, yields the desired color shade matching the territory.
3. Process as in claim 2, characterized in that the pre-dyed fabric sheet is provided on its front side with a partially covering print different from that on its backside.
4. Process as in claim 2 or 3, characterized in that the partially covering color overlay is distributed over the entire fabric sheet uniformly.
5. Process as in claim 2 or 3, characterized in that the partially covering color overlay is distributed over the entire fabric sheet uniformly.
6. Process as in claims 2 or 3, characterized in that only partial areas of the fabric sheet are provided with partially covering color overlays.
7. Process as in claim 2, characterized in that the dyestuffs used for the basic coloring of the fabric sheet and its partially covering color overlays do not mix with one another in the dyeing process.
8. Process as in claims 2 through 7, characterized in that the color overlay is formed by raster/anilox, picco or blotching rolls, by line or contour rolls or the like, or stipples or other small area patterns are applied to the basic coloring by known devices.
9. Process as in claim 2 through 8, characterized in that dyestuffs or dyestuff combinations are used for the color overlay, which display strong absorption in the infrared region over the broadest possible wavelength range.